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Viruses as vectors.

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Traditional vaccines against diseases caused by viruses are based on live attenuated viruses or killed virus preparations. Through the application of molecular biology it is now possible to consider several new approaches to making vaccines, which may combine increased efficacy with greater safety. One of these approaches is to manipulate genetically a virus so that it carries and expresses a foreign gene (or part of a gene) which codes for a protective antigen for another disease. Adeno-, polio- and herpesviruses have been engineered to act as vectors in this way but vaccinia virus remains the main candidate for a recombinant virus vector for vaccine use. The broad host-range of vaccinia virus has made it an effective vector for the analysis of expression of "foreign" antigens as well as a tool for the dissection of the host animal's immune system. For practical purposes in veterinary vaccines, recombinant viruses based on other poxviruses, with more restricted host-ranges, may have certain advantages. Work on the development of recombinant avipoxviruses and capripoxviruses as prototype vaccines for use in poultry and ruminants, respectively, is discussed and illustrated. (39 Refs.)